April 6, 2011

Exam 3, sky watch back.

Flatland reports – a can of worms, next two slides.

Reading: Chapter 9, Sections 9.5.2, 9.6.1, 9.6.2. 9.7, 9.8

Chapter 10, Sections 10.1-10.6, 10.9

Astronomy in the news: (NYT) physicists at Fermilab in Illinois report a tentative new particle, unknown to physics, not the expected Higgs boson that gives mass to particles. Needs to be confirmed by Large Hadron Collider at CERN in Geneva.

Pic of the day: face-on spiral galaxy M74 in Pisces, about 30,000 light years across.

Plan II sponsors screening of "Flatland"
Description: "Flatland" (2001) is a feature film adaptation of the 1884 novel by Edwin A. Abbott. It is the creation of independent filmmaker Ladd P. Ehlinger Jr., who directed, animated and edited the film. Producers Seth Caplan ('99) and Dano Johnson ('01), Plan II alumni, will introduce the film and talk with audience members about it and their own collaboration with Plan II Math Professor Michael Starbird.

Time: Saturday, 2-3:30 p.m.
Location: Texas Union Theater
Admission: Free and open to the public
URL: http://www.flatlandthefilm.com/

Up to 5 points extra credit on 3rd exam for those who attend and write up a report (minimum 500 words, typed).

Flatland Reports

Plagiarism is potentially punishable by expulsion from the University.

Flatland reports that appear to be “paraphrases” of Wikipedia or other written descriptions will get -1 point for exam 3.

Flatland reports that appear to deserve some benefit of doubt will get +1 point.

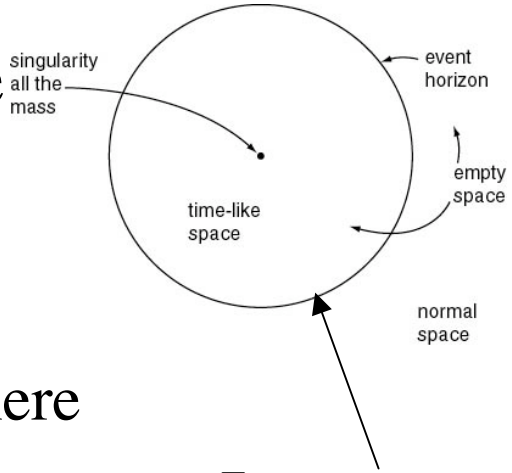
Reports from people who clearly attended the Saturday showing will be graded on a scale of 5.

For anyone who feels their grade is unfair, I will accept a written, signed statement describing when, how, and where you actually viewed the film and will reconsider your grade.

Goal:

To understand the full space-time associated with non-rotating black holes.

Non-rotating Schwarzschild Black Hole



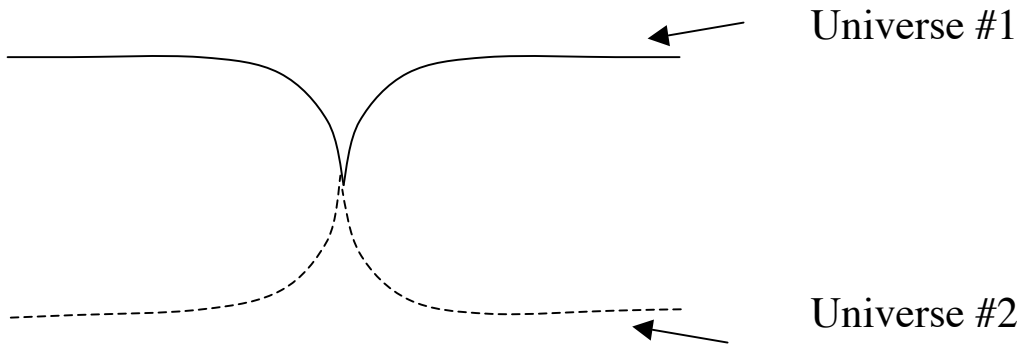
Mass, but no spin, no electrical charge

Assume all mass is in the singularity, no mass anywhere else (assumption necessary to solve equations)

Find two Universes, each of infinite space, connected at one instant by the singularity.

Cannot pass from one to the other if travel at less than the speed of light

Event horizon is also surface of infinite redshift



Somewhere else in hyperspace

Goal:

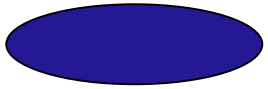
To understand the full space-time associated with rotating black holes.

Rotating Kerr Black Hole

Mass and spin, but no electrical charge

Assume all mass is in the singularity, no mass anywhere else
(assumption necessary to solve equations)

Find ***singularity is a ring*** (not a point)

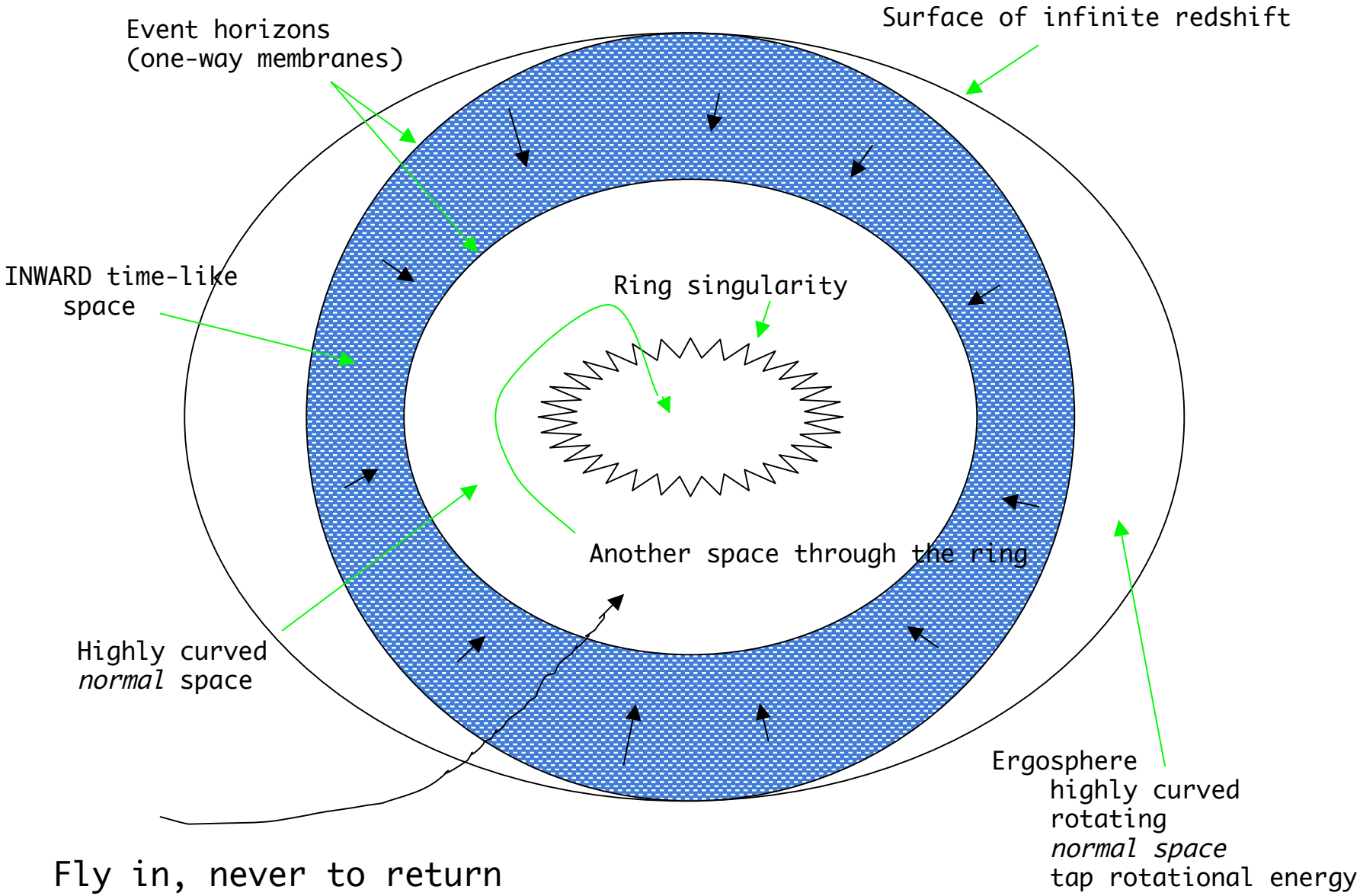


0 thickness, ∞ density, still uncertainty problem

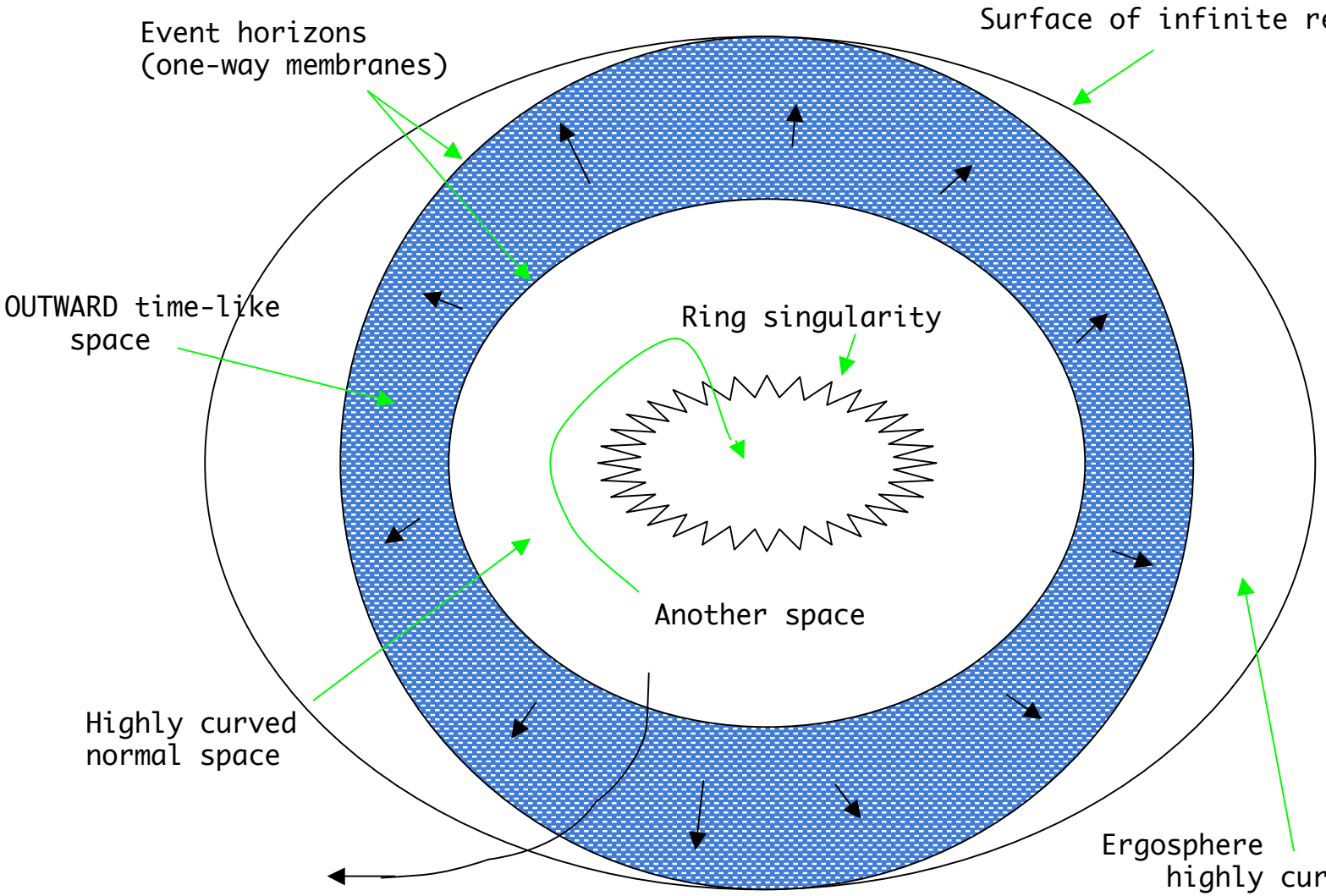
Infinite Universes!

(implicitly spread through hyperspace)

Cross-sectional view of rotating Kerr black hole



In future



Access to Universe different
than original one

Are Different Universes Real?

In Real Universe:

Light falls into the black hole

Photons are Doppler blue shifted, accelerated to higher energy, compacted into a thin shell: ***Bluesheet***
=>the energy/mass of the blue sheet warps the space
changes the mathematical, hence the physical solution

So, probably not in this case, but stay tuned…